

FUEL TANK

Choose the proper fuel tank as recommended by the manufacturer of your airplane kit. Thunder Tiger has a series of new tanks that are available at your hobby dealer

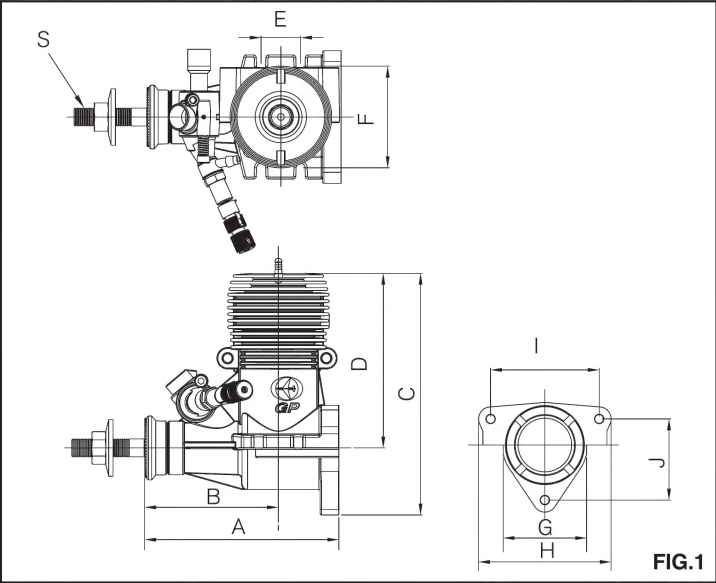
FUEL LINE

Choose a high quality, silicone fuel line for use with your Thunder Tiger engine.

INSTALLATION OF THE ENGINE

Mount your engine securely to rigid hardwood rails (e.g. maple) or a radial engine mount of metal or glass-filled nylon composition. The top surfaces of the motor mount must be absolutely flat and parallel to avoid crankcase distortion and stress. Be sure to use only the highest quality mounting hardware such as hardened steel screws, etc. In order to reduce engine noise, a flexible engine mount can also be used.

There is another convenient way to mount your new GP engine to fire wall of your airplane by using engine backplate. The major dimensions of this engine are shown as FIG.1.

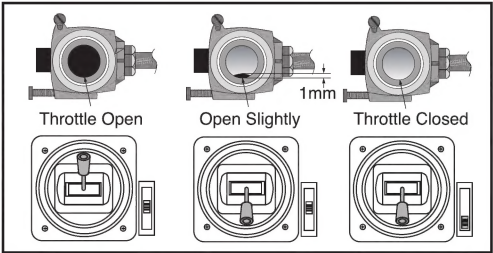


unit:mm/in

	A	B	C	D	E	F	G	H	I	J	S (Thread)
GP-07 9007	47.1/ 1.85	31.8/ 1.25	56.3/ 2.22	39.9/ 1.57	10.0/ 0.39	25.0/ 0.98	19.4/ 0.76	30.4/ 1.20	24.0/ 0.94	19.5/ 0.77	M4x0.7
GP-18 9018	60.8/ 2.39	43.3/ 1.70	76.3/ 3.00	54.5/ 2.15	14.4/ 0.57	33.0/ 1.30	25.4/ 1.00	42.5/ 1.67	34.0/ 1.34	26.6/ 1.05	7/32"-32 UNF
GP-28 9028	68.8/ 2.71	47.4/ 1.87	85.7/ 3.37	61.9/ 2.44	14/ 0.55	36.0/ 1.42	29.6/ 1.17	47/ 1.85	38.5/ 1.52	28.7/ 1.13	1/4"-28 UNF

RADIO SET-UP

Set up your throttle servo linkage to the carburetor throttle arm so it provides the action indicated when the transmitter throttle stick is moved.



FUEL TANK

The fuel tank should be mounted as close to the engine as possible. Ideally, the center line of fuel tank should be level with the needle valve. The design of your aircraft will determine the actual tank location, but use the above instruction as a guide. Keep in mind that tank location can have a major impact on engine performance. Make sure that your engine fuel system is sealed and well constructed to eliminate the possibility of fuel or air leakage. If possible, wrap your fuel tank with high quality foam rubber to reduce fuel foaming from airframe vibration.

GLOW PLUG

Use a 4-way wrench to insert the glow plug into your engine. Be careful not to use excessive force, but make sure the plug is tight and the copper washer is properly sealed beneath the glow plug.

MUFFLER/SILENCER

After the engine is mounted in your model or test stand, secure the muffler to the exhaust pipe. Be sure to tighten them firmly. The rear half of the muffler can be rotated to direct the exhaust residue away.

FUEL AND PRESSURE LINES

After installing the engine, use knife or razor blade to cut the silicon tube to proper length for use as fuel and pressure lines. As illustrated, connect the fuel tank to the carburetor and the fuel tank to the pressure fitting on your muffler. Do not use any tool to cut the silicon tube that may cause it to split or crack.

PROPELLER

Mounted the suitable propeller securely to your engine. Screw the propeller slowly to the crankshaft of your engine in a counter-clockwise direction until compression is first felt near the position the piston is close to Top Dead Center (TDC). Turn the propeller so that the blades are set at the 2 and 8 clock positions and use the proper wrench to tighten the propeller nut. If using a spinner, make sure that the cut-out area for the propeller blades offer adequate clearance so that no part of the prop is touching the spinner.

CAUTION:

It's extremely important to check the balance of your propeller before attaching it onto your engine. An unbalance propeller can cause substantial damage to both the aircraft and the engine. You can use a propeller balancer (Thunder Tiger No. 3163 Aluminum Propeller Balancer) to balance your propeller before using.

BREAK-IN /RUN-IN PROCEDURES

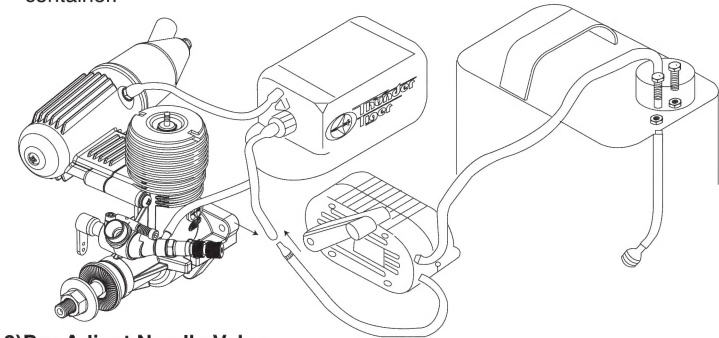
Proper break-in is critical to the life of any model engine. Because your Thunder Tiger GP series engine has been precision-made from quality material and is and ABN (Aluminum Piston, Brass Cylinder with Nickel Coating) type engine, a prolonged break-in period is not necessary. In fact, after a tank or so on the ground, your engine can be flown to break it in. The break-in period can take place on your model or on a test stand. Many companies offer good quality, low cost engine test stands should you choose to bench-run your engine prior to installation in the aircraft. Never use a vise to hold an engine for break-in as this can distort the crankcase and ruin your engine. No matter where the breaking-in is done, you can break-in your engine as follows:

1)Fuel, Glow Plug & Propeller Selection & Installation

Use the proper fuel, glow plug and propeller as described in NECESSARY ACCESSORIES. And make sure that the glow plug and propeller are installed and properly tightened.

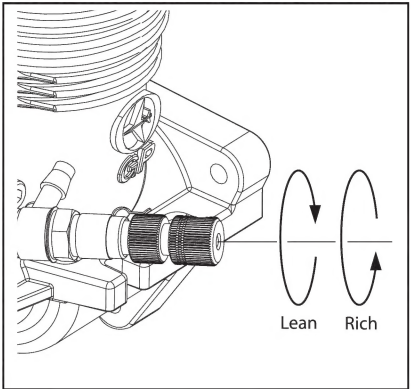
2)Filling the fuel Tank

Disconnect the pressure line from the pressure fitting on the muffler and fuel line from the fuel inlet on the carburetor. Connect the fuel line to the tubing from fuel pump to fill the fuel tank until fuel overflow into the pressure line indicating the tank is filled. Re-connect fuel line to fuel inlet and pressure line to pressure fitting. Be sure to not let dirt or dust enter fuel container.



3)Pre-Adjust Needle Valve

During the break-in period, run the engine under "rich" condition. Turn the needle valve clockwise until you begin to feel resistance. This is the fully closed position. Do not forced the needle valve or you may damage the carburetor! Now turn the needle valve counter-clockwise about 2 1/2 ~ 3 turn open. This will be a good place for start. (Turn the needle valve clockwise to "close" for leaner mixture, while counter-clockwise is to "open" for richer mixture.)



4)Choking/Priming Your Engine

Using your radio control system, move the throttle stick to open the throttle to 1/2~3/4. Place your finger over the carburetor opening (without the glow plug starter connected!) and rotate the propeller 2~3 turns or until fuel flows through the fuel line into the carburetor.

The quantity of fuel drawn into the engine by priming is an important factor for starting your engine successfully. It needs more fuel for the first starting and when the engine is cold. It will be quickly learned with experience.

5)Heating Glow Plug

Fit the glow starter or connect the 1.5volt ignition battery onto the glow plug. The glow plug is designed to keep the engine running after removing the glow starter or cutting off the ignition battery. The platinum alloy coil inside the glow plug is heated up with the starter battery current, and remains hot to keep the engine running even after the electronic power is cut off.

6)Flipping propeller to start the engine

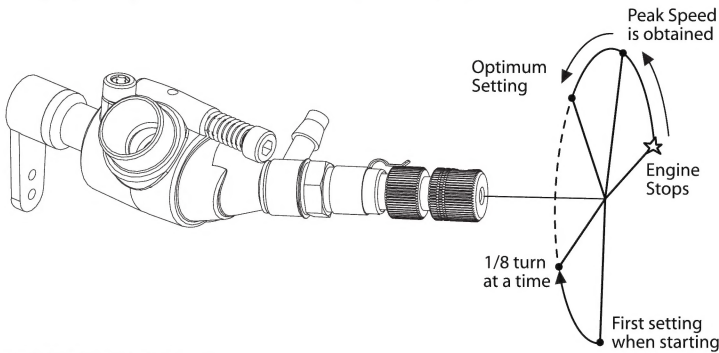
Using your radio control system, move the throttle stick so the carburetor rotor is 1/4~ 1/2 open. Flip the propeller to start the engine by using a "chicken-stick" or electric starter. The engine should fire after a few flips. If you break-in the engine on the aircraft model, when the engine start, have a helper hold your aircraft to prevent it from moving.

CAUTION

- 1) Do not place anything in the path of the propeller.
- 2) Practice flipping the propeller quickly without connecting the battery. Quick flipping and adequate priming are important factors for starting your engine successfully.

7)NEEDLE VALVE ADJUSTMENT

After the engine starts, advance the throttle to full open. At this point, the engine should be running under "fuel rich" condition (i.e. dense smoke coming from the exhaust). Close/Lean(turn clockwise) the needle valve gradually until you hear a noticeable sound due to an increase in R.P.M.. Remove the glow-starter from the engine with care so that it does not touch the rotating propeller. The engine should keep running. If it stops, close/lean the needle valve a little further, and re-start the engine. Close the needle valve about 1/8 turn, and listen for the change of R.P.M.. After the R.P.M. increase, close the needle valve 1/8 turn at a time listening for a change of R.P.M.. If the R.P.M. of the engine does not instantly change with needle valve adjustment, slowly lean the needle setting until the R.P.M. decreases. Back the needle valve off to where the peak R.P.M. position is. At that point, richen the needle setting slight until you hear a slight (but noticeable) decrease in R.P.M. You should never set your engine for peak R.P.M. on the ground, as the mixture always leans out slightly in flight due to the "unloading" of the propeller in the air.



8)STOP THE ENGINE

Cut off the fuel supply to the carburetor by pinching closed the fuel line or disconnect the fuel line. You may also stop the engine using your radio control system by going below the idel position with the throttle trim lever on your transmitter.

CAUTION

Do not use your hands, fingers, any parts of your body, or throw any object into the propeller to stop the engine. Be careful not to touch the rotating propeller or the hot engine.

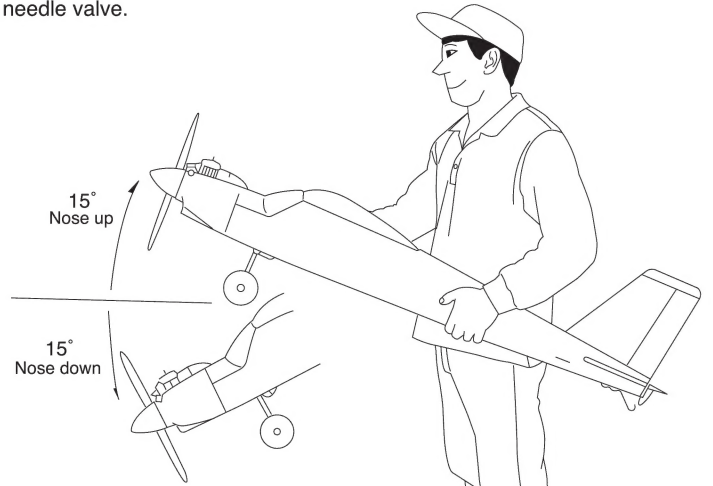
CAUBURETOR ADJUSTMENT

The air-bleed carburetor with a throttle rotor and an air-bleed screw provides a wide range of engine speed control from idling to full power. The throttle rotor with the throttle lever linked to a servo under the control of the

R/C system in your model will enable engine speed to be varied. As the carburetor of your engine has been factory set for approximate best running with fuel tank correctly located as previous described, it should not be required to adjust anything except the needle valve. After the engine has been broken-in, check the operation of the throttle according to the following and re-adjust the air-bleed screw when necessary.

NEEDLE VALVE ADJUSTMENT

In order to determine the best position of the needle valve, you should hold your aircraft and rotate the nose up approximately 15° slowly. If the engine speeds up and attempts to stop, rotate the aircraft nose down to the horizontal position and open (counter-clockwise) the needle valve 1/4~1/2 turn. Then repeat the nose up procedure again to get the best setting of the needle valve.



AIR-BLEED SCREW ADJUSTMENT

- 1) Start the engine and open the throttle fully.
- 2) Adjust the needle valve to the best position.
- 3) Close the throttle gradually from the highest speed to idle.
- 4) Find and fix the idling position where the lowest possible R.P.M. with steady running is obtained by means of the throttle trim on your transmitter without risk of the engine stopping.
- 5) In order to determine which way to adjust the Air-bleed screw, first determine the present condition of the idle fuel mixture. Hold your aircraft and slowly rotate the nose up approximate 15°. If the engine runs unevenly or stops, immediately rotate the nose down approximate 15°. The engine should run steadily. Stop the engine and close (clockwise) the air-bleed screw about 1/2 turn. If the idling speeds up with the nose down, then stop the engine and open the air-bleed screw about 1/2 turn.

Note:

These adjustments can be made without stopping the engine. However, it is adjustable for beginners to stop the engine for safety reasons.

ENGINE CARE

Always keep the outside of your engine clean. Use clean, fresh fuel can keep your fuel can, pump, and fueling system free from dirt particles. Install a fresh filter between the fuel tank and carburetor, and between your fuel pump and filling line to prevent any dirt from entering your engine. Model fuel contains alcohol, which is hydrosopic (meaning that it attracts moisture from the atmosphere). This can cause corrosion to the internal engine parts. After each flying session, run all the fuel out from inside the engine by disconnecting the fuel line from the carburetor. If you will not be using your engine for a while, we suggest removing the engine from the model, liberally and applying 4 or 5 drops of after-run oil (Marvel Mystery Oil, Zap, etc.) into the carburetor and glow plug hole, and wrap your engine in a soft cloth and store in a sealed plastic bag.

Do not dismantle your engine unnecessarily, as this may upset precision fits such as piston/cylinder and crank pin/connecting rod assembly. If it is necessary to clean your engine completely (such as after a crash), remove only the muffler, backplate, and cylinder head. Flush the entire engine with fresh fuel and reassemble. Apply after-run oil to the engine and store or re-install the model. Do not disassemble your engine further than described above, or your warranty may be voided.

Thunder Tiger has provided you a special tool for normal maintenance. You can use this tool provided in the box to dismantle the cylinder head and/or the backplate. The 2 plugs on the tool should be matched with the 2 slots on the parts, then twist the tool counterclockwise to loosen the parts (clockwise

to tighten the parts). While using this tool, you should ensure that it is flat against the surface of the cylinder head and make sure the 2 plugs are fully engaged in the slots. Please make sure to use the tool properly, or it may cause damage both to the tool and/or the parts.

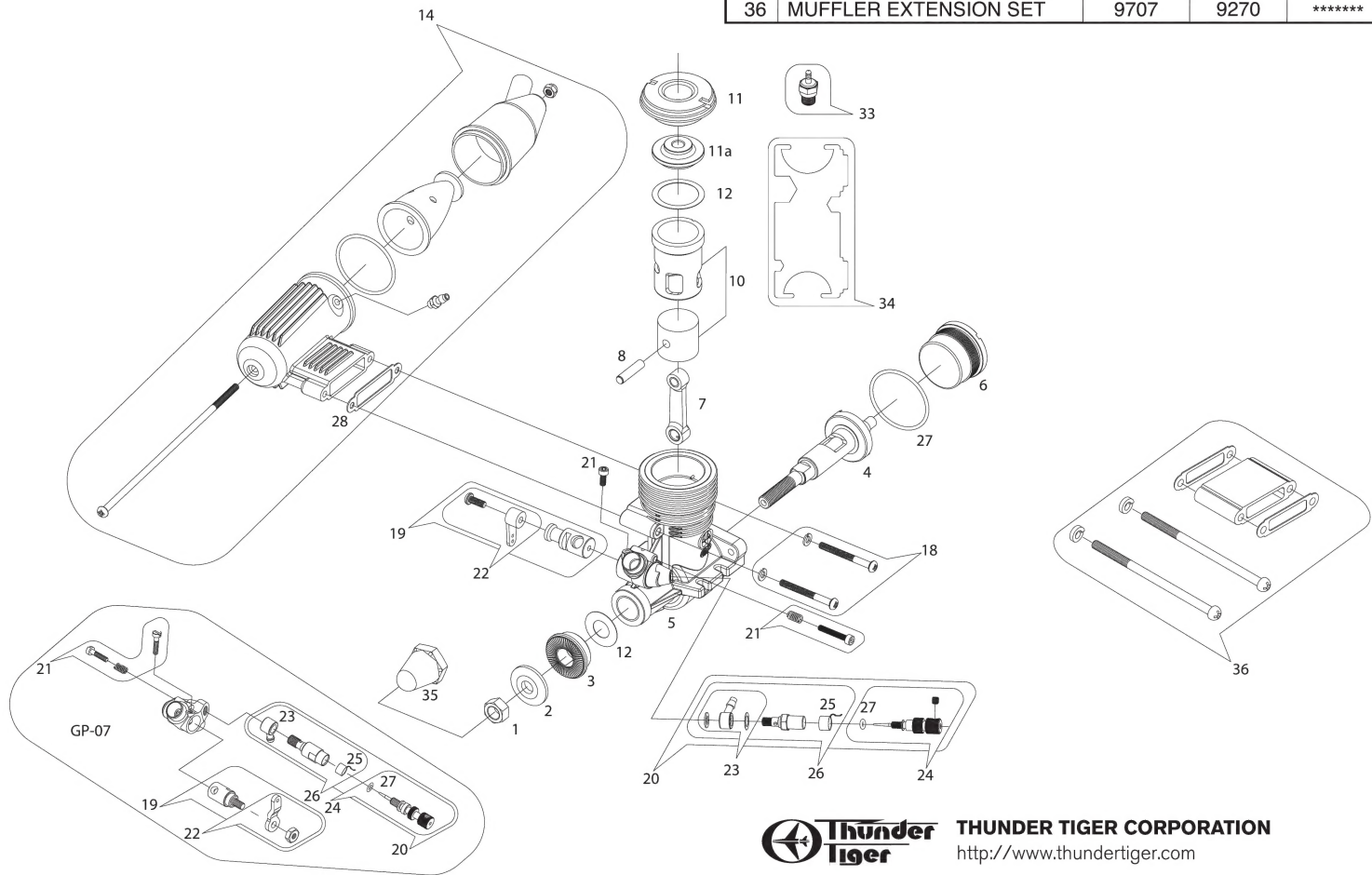
THUNDER TIGER 3 YEARS LIMITED WARRANTY

Your engine is guaranteed to the original purchaser to be free from defects in materials and workmanship for a period of 3 years from the date of purchase when returned for service accompanied by proof of purchase (register receipt, credit card invoice, etc.). Crash damage or problems caused by improper use are specifically not covered under this warranty. Damage caused by customer disassembly, use of improper or substandard fuel, use of improper accessories (such as propellers, glow plug, etc.) or any use of product other than its specific intended use will automatically void this warranty.

SERVICE PROCEDURES

Should your Thunder Tiger engine require service, please follow the following guidelines:

- 1.Do not return the engine to the place of purchase, as they are not authorized or equipped to perform service.
- 2.Remove the engine from the model. We cannot accept equipment for service other than engine.
- 3.Along with your engine and proof of purchase, enclose a complete written explanation detailing the problem(s) with your engine. Be sure to include your name, address and daytime telephone number. BE SURE TO INCLUDE YOUR PROOF OF PURCHASE!!
- 4.For repairs not covered under warranty, the charges will be billed to you C.O.D. Please mention if you wish to have an estimate of non-warranty repair charges prior to us beginning service. (This may cause a slight delay in your repair)
- 5.For customers outside of the U S. and Canada, contact the authorized Thunder Tiger agent in your country.
- 6.For U.S. and Canadian customers, send your engine via insured mail or U.P.S. to ACE HOBBY DISTRIBUTORS, INC.



PARTS LIST / ENGINE				
No.	DESCRIPTION	GP-07 9007	GP-18 9018	GP28 9028
1	PROP NUT	*****	AA0001B	AA0025B
2	PROP WASHER	*****	AA0143B	AA0026B
3	DRIVE WASHER SET	AA0690	AA2204	AA2187
4	CRANKSHAFT	AA0684	AA2205	AA2188
5	CRANKCASE	AN0680	AN2213	AN2196
6	BACKPLATE SET	AA0688	AA2212	AA2195
7	CONNECTING ROD	AN0687	AN2207	AN2190
8	WRIST PIN ASSEMBLY	AN0689	AN2217	AN2200
10	CYLINDER & PISTON	AN0681	AN2211	AN2194
11	CYLINDER HEAD	AA0686	AA2216	AA2199
11a	COMBUSTION CHAMBER	AA0685	AA2215	AA2198
12	GASKET SET	PN0181	PN0269	PN0268
14	MUFFLER ASSEMBLY	9736	9799	9779
18	MUFFLER BOLT SET	PN1520	PN1520	PN1511
19	THROTTLE ROTOR SET	PN1159	PN1323	PN1317
20	NEEDLE VALVE W/HOLDER SET	PN1160	PN1324	PN1312
21	IDLE ADJUSTING SCREW SET	PN1267	PN1313	PN1313
22	THROTTLE LEVER SET	PN1318	PN1065	PN1065
23	FUEL INLET	AA1249	PN1217	PN1217
24	NEEDLE VALVE SET ONLY	PN1161	PN1325	PN1315
25	RATCHET SPRING	AA1288	AA1181B	AA1181B
26	NEEDLE HOLDER W/FUEL INLET	PN1321	PN1316	PN1316
27	O-RING SET	AA1015	PN1326	PN1314
28	MUFFLER GASKET	PN1529	PN1516	PN1514
31	PROP. BUSHING,d4xD5x5mm	AA0768	*****	*****
	PROP. BUSHING,d4xD6.3x5mm	AA0769	*****	*****
33	GLOW PLUG	9281	9281	9281
34	WRENCH	AA0750	AA2201	AA2201
35	SPIN PROP NUT	AA0692	*****	*****

OPTIONAL PARTS				
No.	DESCRIPTION	GP-07 9007	GP-18 9018	GP28 9028
35	SPIN PROP NUT	*****	AA2206	AA2189
36	MUFFLER EXTENSION SET	9707	9270	*****

THUNDER TIGER GP SERIES ENGINE INSTRUCTIONS



GP-28 / 9028 SHOWN

INTRODUCTION

Congratulations on your purchase of a Thunder Tiger model engine. The new GP series engine are designed & developed under the “Green Power” concept. They feature a one-piece crankcase with an integrated carburetor body design in order to have fewer parts. Less parts provides less problem. No mounting screws are required for the cylinder head and back plate. A cast slot engine mount design simplifies the machining process. Equipped with 3-chamber muffler, noise levels are reduced while providing excellent performance with low fuel consumption. Inherited are the swept-back needle valve design and precision air bleed carburetor to make operating safe, reliable and simple. All major components of Thunder Tiger engines are machined from the highest quality materials in our state-of-the-art manufacturing plant. Engines are then subjected to rigorous quality control checks to ensure that your engine will provide years of trouble free use.

IMPORTANT

Be certain to completely read all of the instructions supplied with your engine, and pay close attention to the "SAFETY INSTRUCTIONS AND WARNINGS".

SPECIFICATIONS

Engine	GP-07	GP-18	GP-28
Item No.	9007	9018	9028
Displacement(cc / cu.in)	1.13 / 0.069	2.93/0.179	4.53/0.276
Bore (mm /in.)	12.0 / 0.472	16.2/0.638	18.7/0.736
Stroke(mm / in.)	10.0 / 0.394	14.2/0.559	16.5/0.65
Practical R.P.M.	4,000~18,000	2,500~18,000	2,500~17,000
Output Power(BHP/RPM)	0.19/17,000	0.45/17,000	0.7 / 16000
Weight, w/o muffler (g/oz)	94.4 /3.33	162.2 / 5.72	221.1 / 7.80

LEARNING ABOUT YOUR ENGINE

Before actually operate your engine, the following information is for the benefit of the newcomers with no experience of model engines. Please put the engine near you and read this instruction. The model engine is just like the engine of a motorcycle or a car that needs a key to start. You have to prepare some accessories and knowledge. It is not hard to operate your model engine by following the instructions properly.

NECESSARY ACCESSORIES

The following items are necessary for operation your engine, and are available from your local hobby supplier.

FUEL

A good quality, commercially available fuel containing 25% lubricant and 75% methanol is recommended for break-in/run-in and general use. Fuel containing 5%~15% nitromethane and 20% lubricant is for use when more power is

required. Most fuels contain synthetic lubricants(only) are much less tolerant of a lean run compared to fuel that contains castor oil. If availability or local conditions force you to use a fuel that contains only synthetic lubricant, we suggest that you keep the needle valve set to slightly richer setting, allowing more lubricant to flow through the engine in order to extend engine life and maintain optimum reliability. Do not use fuel containing less than 20% lubricant.

CAUTION

1) Methanol and nitromethane are poisonous and highly flammable.
Keep out the reach of small children and keep away from heat and open flame.

2) Excessive heat can greatly reduce the life of your engine. Most of the heat generated by combustion is removed via the lubricants that are contained in your fuel, and exits the engine as exhaust vapor. As a precaution, you should periodically remove the muffler from your engine and visually inspect the exhaust port and piston. If the outer surface of the piston is stained a very dark color, it can indicate that your engine may be overheating. This can be caused by either an excessively lean needle setting or a lack of airflow across the cylinder and head.

3) Enclosed cowlings look great but can harm your engine if not constructed for proper airflow! A general “rule of thumb” is to allow twice the area of air exiting the cowl as entering (i.e. if your cowl has 4 sq.in. of inlet area, it should have 8 sq.in. of exit area). The above guidelines are particularly critical when using fuels containing only synthetic lubricant.

GLOW PLUG

The type and quality of glow plug used in your engine will have a major impact on overall performance and reliability. For Thunder Tiger GP series engine, we strong recommend to use Thunder Tiger REDLINE R1(#9774) R2(#9281) R3(#9775) glow plug. And for other brand glow plug such as O.S No.8, Enya No.3, ATS#3..etc. are also good for the GP series engine.

GLOW STARTER

The electric power source for heating the glow plug during starting the engine (1.2~1.5V). Thunder Tiger have a series rechargeable glow starter to matching you operating requirement. (#2156~#2161, #2196, #2191, #2192, #2193)

PLUG WRENCH

Used for tightening the glow plug as well as the propeller nut. A Thunder Tiger #1102 4-way wrench is recommended.

FUEL PUMP

Required to fill the fuel tank in your model. A Thunder Tiger hand-crank pump (#1645) or 12V electric pump (#1658) are available from your hobby dealer.

ELECTRIC STARTER

Most engines can be started quickly with an electronic starter. Used with a 12 volt battery, it is the safest and most convenient starting method. A Thunder Tiger #2674, #2675 Starter is recommended.

PROPELLER

Suggested propeller sizes are shown in the table below, with allowances for different type of aircraft and performance goals. Keep in mind that factors such as aircraft weight, size, style and type of flying will affect your choice of props. After break-in, select the optimum prop size by practical flying tests. Begin your tests with suggested propeller sizes in the table below: Thunder Tiger Cyclone® propellers are made of top grade nylon material with fiber added and available for all engines need from .06~.75. for your choice.

Engine	Breaking - in	Stunt/Aerobatic
GP-07	6x3	6x3, 6x4, 7x3
GP-18	8x4	8x5, 8x6
GP-28	9x6	9x6, 10x5

